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(54) Utilising refuse

(57) A process for utilising refuse comprises first separating the refuse into at least one paper fraction (which is further processed for producing fibrous material) and a residual fraction, the slops (e.g. plastics films, textiles) accumulating during the production of fibrous material from the paper fraction being subjected to pyrolysis together with the residual fraction and the heat obtained is used in the production of the fibrous material.

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Fig. 1

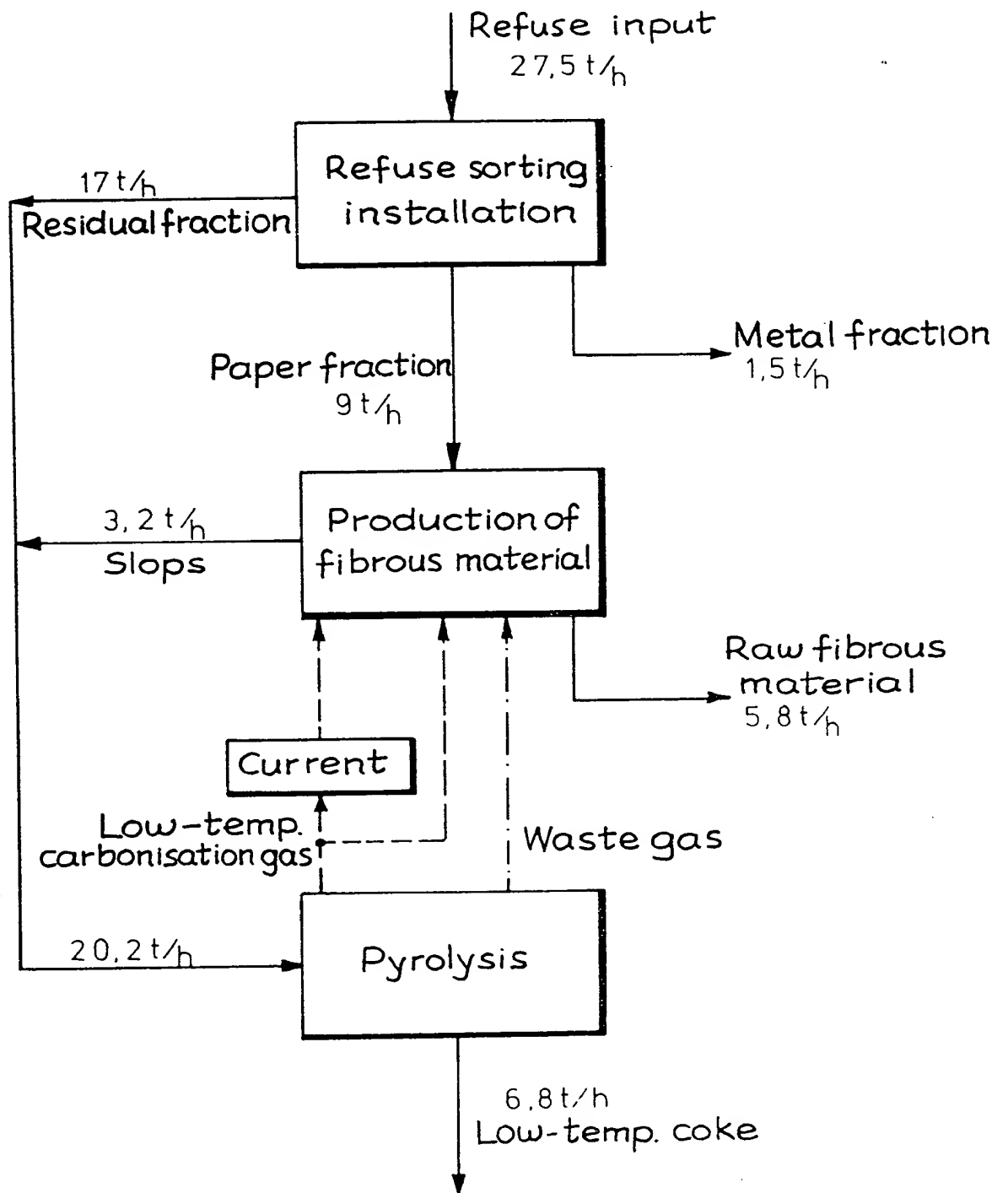
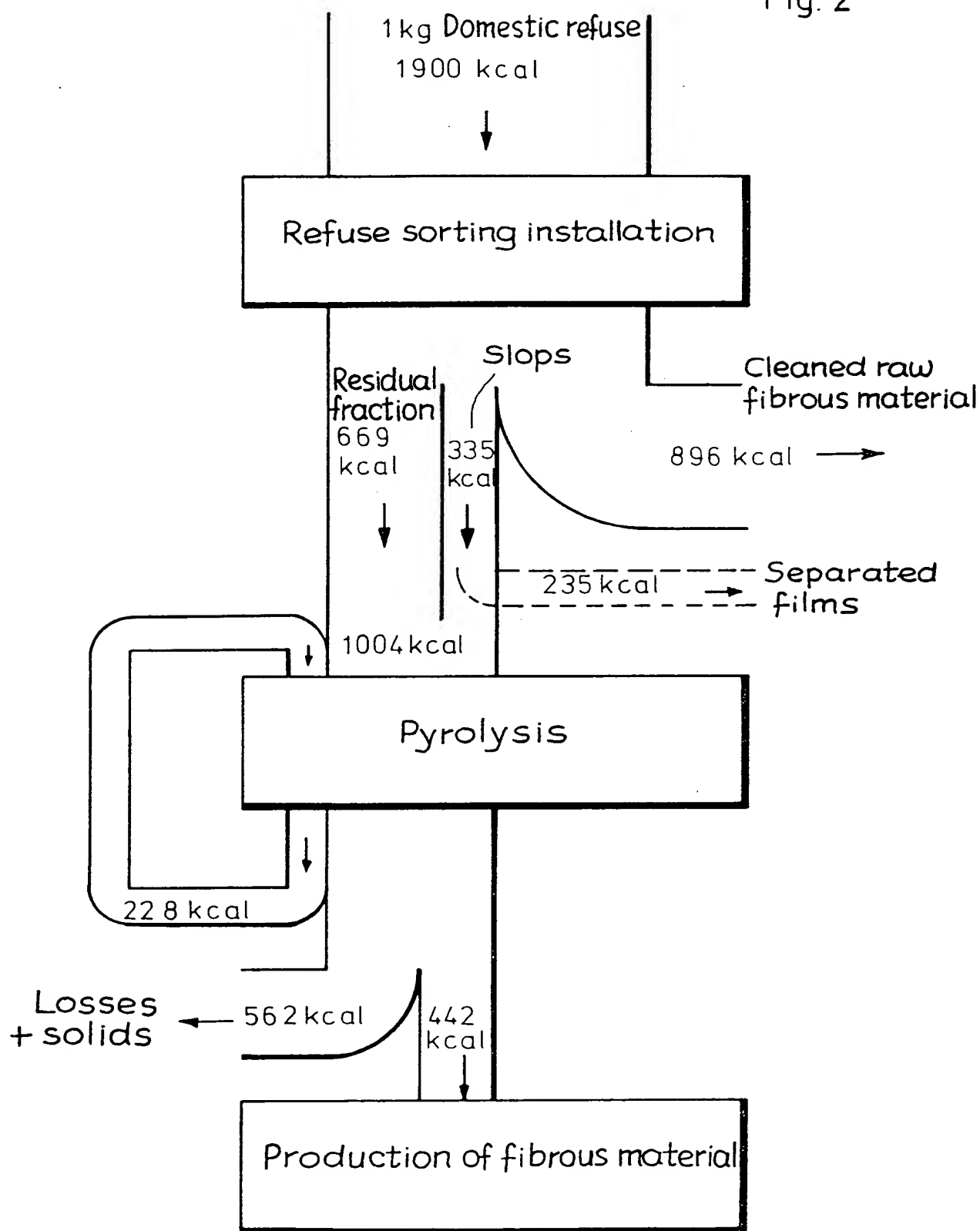


Fig. 2



## SPECIFICATION

## A process for utilising refuse

- 5 This invention relates to a process for utilising refuse in which the refuse is initially separated into at least one paper fraction and a residual fraction, the paper fraction is subjected to further processing for making paper and the residual fraction is utilised for its energy content.

It is known that the paper fraction obtained in the sorting of refuse may be used as old paper in the manufacture of paper. On account of the high foreign matter content, difficulties are involved in processing the waste paper obtained by sorting refuse because the sorting installations of the conventionally equipped waste paper industry are not designed for separating the high foreign matter content. For this reason, the waste paper obtained from the sorting of refuse is only used to a certain extent together with standard commercial-grade old paper in the manufacture of paper.

In a further processing of the waste paper obtained in the sorting of refuse for paper-making purposes, the undesirable foreign constituents (such as plastics films, textiles, etc.) are separated out in the form of so-called "slops" which it would be extremely desirable to utilise in view of their considerable energy content, but which cannot be incinerated together with domestic refuse on account of the possible formation of local heat spots and the excessive pollutant concentration formed during incineration. Accordingly, they are dumped as special refuse without their energy content being utilised. The special refuse character of the slops and the considerable quantities in which they accumulate impose an undesirable financial burden on the production of fibrous material from waste paper.

The object of the present invention is to obviate the disadvantages referred to above and to provide a process for utilising refuse which is distinguished by considerably reduced outlay on plant and energy for further processing the paper fraction obtained in the sorting of refuse for papermaking purposes. According to the invention, this object is achieved in that the slops accumulating during the production of fibrous material from the paper fraction are subjected to pyrolysis together with the residual fraction from the sorting of refuse and the thermal energy obtained is used for producing the fibrous material.

According to the invention, therefore, the utilisation of refuse for its energy content and the further processing of the paper fraction obtained from the refuse for paper-making purposes are combined into a composite process which provides for a considerable saving of energy, for a considerable simplification of

the process itself and of the installation required for carrying it out and for a particularly high-quality starting product for the manufacture of paper.

In the process according to the invention, the paper fraction obtained in the sorting of refuse is directly further processed into a fibrous starting material in a paper factory equipped for separating off the increased foreign matter content (in contrast to conventional processes, therefore, it is not processed into paper or board which would require a further fine purification stage). This simplifies further processing for papermaking purposes and enables the fibrous raw material to be used in any conventionally equipped waste-paper-processing paper factory. The direct further processing of the waste paper in the vicinity of the refuse sorting plant promotes the use of the energy obtained during utilisation of the refuse for the production of raw fibrous material, as will be explained in the following.

According to the invention, the residual fraction from the sorting of refuse and also the slops accumulating during the production of fibrous material from the paper fraction are together subjected to pyrolysis. The use of pyrolysis for utilising the energy of these waste materials affords the considerable advantage that, due to the absence of air or oxygen, no uncontrolled heat spots can be formed during pyrolysis of the slops and the pollutant gases given off during pyrolysis can be purified effectively and inexpensively by virtue of the low gas volume which only amounts to between 15 and 20% by comparison with the quantities of smoke gas given off during the incineration of refuse. Accordingly, it is also possible by pyrolysis to recover the considerable energy content of the slops accumulating during production of the fibrous material which, hitherto, it has been difficult to utilise. The common utilisation of the residual fraction obtained in the sorting of refuse and of the slops accumulating during production of the fibrous material for their thermal energy enables the installation required for pyrolysis to be provided with particularly economic dimensions.

By virtue of the fact that the thermal energy obtained during pyrolysis of the residual fraction from the sorting of refuse and the slops accumulating during production of the fibrous material is used for production of the fibrous material (a highly endothermic process), it is possible to obtain a largely compensated energy balance of the entire composite system.

However, it is of course also possible completely or partly to separate other useful constituents, such as plastic films and glass, in addition to the metal fraction and the paper fraction during sorting of the refuse. The extent to which use is made of this possibility will be determined by the proceeds obtained

refuse are subjected to low-temperature carbonisation in the substantial absence of air.

3. A process as claimed in Claim 1, characterised in that, after cracking of the long-chain organic constituents present in them, the low-temperature carbonisation gases produced during pyrolysis are directly used for covering the heat demand for production of the fibrous material.

10 4. A process as claimed in Claim 1, characterised in that at least part of the low-temperature carbonisation gases produced during pyrolysis is used for generating current after cracking of the long-chain organic constituents present in them.

15 5. A process as claimed in Claim 1, characterised in that the refuse is sorted into at least one paper fraction, a metal fraction and a residual fraction.

20 6. A process as claimed in Claim 5, characterised in that, in addition to the metal fraction and the paper fraction, other useful constituents, such as plastics films and glass, are completely or partly separated from the refuse.

25 7. A process as claimed in Claim 1, characterised in that, in addition to the residual fraction obtained during sorting of the refuse and the slops accumulating during production of the fibrous material, other refuse, particularly special refuse, and unsorted refuse of low paper content are subjected to pyrolysis.

30 8. A process as claimed in Claim 1, characterised in that several paper fractions are separated during sorting of the refuse, of which the fractions having a relatively large long-fibre content are used for production of the fibrous material whilst the fractions having a relatively large short-fibre content are subjected to pyrolysis together with the residual fraction.

35 9. A process as claimed in Claim 1, characterised by sorting of the refuse under dry conditions where the light components of the refuse, such as paper, cardboard, films and textiles, are separated from the heavier components by an air stream.